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THE HALIOTIS OR ABALONE INDUSTRY OF THE CALIFORNIAN COAST: PRESERVATIVE LAWS.

(Read before The Historical Society, Feb. 8, 1907.)

BY MRS. M. BURTON WILLIAMSON.

The Abalone industry has reached such commercial value on the California Coast that it has been necessary to enact a law to protect and preverve these boneless mollusks. The law tries to do this by limiting the size of the shells collected, young ones being prohibited by the statute.

In point of time these invertebrate fishes outrank man, having appeared on the earth during the Upper Cretaceous epochs and clung to Eocene, Miocene and Pliocene rocks during millions of years!

The consumption of the Abalone or Haliotis shell-fish as food is of too early an origin to have been recorded. Athenaeus, a Greek writer noted for epiculiar taste, who lived at the end of the second and beginning of the third century, is reported to have considered the animal of the Haliotis "as exceedingly nutritious but indigestible."* The California Indians were large consumers of these native shell fish, as the many kitchen middens, or shell mounds, testify. The largest abalone shells the writer has seen were from the shell mounds of San Nicolas Island, where, according to Dr. S. Bowers, "Millions multiplied by millions would be but a beginning,"** in enumerating the vast number of shells in the heaps, "of which the Haliotis predominates." Some years ago the writer saw black abalones in a crevice on Santa Catalina Island, and, at first, mistook them for fossils. (a) Jeffreys, the well known English conchologist, is often quoted as authority that "The maritime negroes of Senegal esteemed one species a great delicacy. . . . *H. tuberculata* is habitually eaten by the poor in the north of France and in our Channel Isles, where it is occasionally cooked and served at the tables of the rich."† This species, however, will not compare with the California product in size.

*The Haliotis, or Pearly Ear-Shell, by Robert E. C. Stearns, Amer. Nat., Vol. III, July, 1869, pp. 250-56.

**Ninth An. Rep't. Cal. State Min Bureau, Dec., 1889, p. 60.

(a) Dr. Ralph Arnold says the Kitchen Midden shells are often mistaken for fossils. Memoirs of Cal. Acad. Sciences, Vol. III, p. 337.

†Jeffreys' British Conchology, 5 Vols., London, 1862-69. Quoted in Dr. Stearn's paper on the Haliotis in Amer. Nat.

We know the Chinese and Japanese have been large consumers of these animals from our Pacific shores. It may be safely said that the consumption of these mollusks is world wide, wherever they abound.

The consumption of Abalones by Americans has been rather tentative, but lately there has been an active demand for this article of food, largely due to the manner of preparing the fish for market. It is sold in cans and advertized as "highly recommended by physicians for its strengthening and invigorating qualities" (?) The contents of the can are tiny cubes, or dice-like bits, of shell-fish—not unlike little squares of fishes of the vertebrate type—and these with the liquid are made into soup, chowder, fritters, salad, etc.

As *Halioti* are vegetable feeders and dwell between fissures of rocks daily, and we may say, hourly washed by sea water; a dish of these mollusks ought to be as acceptable to a dainty palate as clams taken from the odorous beds in the San Pedro Channel. While the San Pedro Abalone fishery label their cans both in Japanese and English as "Abalone," one enterprising firm disguises the name under "Eno Laba," Abalone spelled backward!

As an export the fish is dried rather than canned. Before the Abalone fishery became such an industry the writer saw long strings of dried abalones in Mexican stores in Los Angeles. They were nearly oblong in shape, from three to four inches long and like leather in appearance, they formed a fine contrast to the long strings of bright red chili peppers that hung beside them. As the liver, head and mantle of the abalone are removed only the immense foot, it has but one, and abductor muscles are utilized in drying.

The *Halioti* shells are too well known to need describing. In these flat, oval shells, with their spine near the margin are common objects. Their beautiful play of color make the finer specimens objects of admiration as mother-of-pearl curios.

In the early sixties of the last century, when the industry was developed on this coast, it was the shell alone that gave it commercial value. Dr. Stearns, in the paper referred to, wrote in 1869, "The value of the exports of the *Haliotis* or Abalone shells from San Francisco was, in the year 1866, \$14,440, being 1697 sacks, each of two bushels capacity, and in the year 1867 the export had increased to 3714 sacks, worth \$36,090." In 1889* it was said three hundred tons were shipped from the Lower Californian coast in one year, 50 tons being handled by one man in a month's time. The Chinese were the principal gatherers notwithstanding they were prohibited by the Mexican laws.

*West Amer. Scientist, April, 1889, quoted in Mrs. M. Burton Williamson's article on Abalone or *Haliotis* Shells of the Californian Coast, Amer. Nat., Vol. XXVII, 1894, pp. 849-58.

The value of the Abalone fisheries had from 1864, to the latter part of the century, developed from an industry in shells to one of considerable importance as a food export.

In 1892 to 1895, there were Chinese fisheries on the Islands of Santa Rosa, Santa Cruz, San Miguel and San Clemente where the animals were dried and shipped to San Francisco for the local use of Chinese and also for exportation.

In 1899 the Abalone fishery at White's Point, two miles north of Point Fermin, the light house, and four miles from San Pedro, reported 60,000 lbs. of dried Abalones and 30,000 lbs. of shells of \$7,800 value.^(a) The camp at White's Point in 1899, as reported by the Fish Commission had an "American superintendent with 20 Japanese, 9 of whom composed the fishery party, the others working on shore."

The Fish Commission for 1901[†] reported the Japanese as carrying on the Abalone fishery in Monterey county having "diving suits, air pumps" and latest accessories for collecting the mollusks. The products at this fishery amounting to 108,375 lbs. of dried Abalone meat and 63,293 lbs. of shells. San Diego also had its exportation of Abalones, the dried meat being sent to San Francisco before it was shipped to China. The shell and animal part of the Abalone are of about equal weight when collected, but after the liver and other organs are removed from the meat and it is dried for the market only about "10 lbs. of meat is produced from 100 lbs. of shells and meat, a shrinkage of about 90 per cent."

Besides the fisheries mentioned another one of some importance on the northern coast of Mendocino county collected as many as "2300 Abalones a day" according to a writer in *The Overland*.^{*} Here also diving suits, galvanized helmet, etc., are a part of the collecting outfit. In 1903, 14 Japanese were employed, eight attending to the fishing, the others diving, etc. The supervisors of Mendocino county allowed this fishery to be conducted by the Japanese paying a license of \$25.00 per quarter^{**} although \$100 per quarter was mentioned at first as the amount necessary.

The collecting of Abalone fish by using diving armor is an innovation in the United States in the fishery industry.^{***} The diver goes down to a depth ranging from 20 to 75 feet of water. He uses a net-like basket and this is hauled up and emptied by men above. Then the shells are taken to camp. Big wooden tubs hold the meat which is washed, salted and the following day par-boiled

^(a) Notes on the Fisheries of the Pacific Coast in 1899, by W. A. Wilcox, U. S. Fish Com., June 20, 1904, Doc. No. 705.

[†]Ibid.

^{*}"The Abalone," Sam Ward; *The Overland*, Dec., 1903, p. 534.

^{**}*The Overland*.

^{***}Fish Com., 1901, Doc. 705.

and placed in the sun for a few hours, smoked for three hours, again boiled, dried, and this process is repeated, the drying time extending over weeks, the boiling probably as many hours. The fish are dried on trays.

A description of the fishery at White's Point gives a good idea of a Japanese fishery on the Californian coast. At this Point there are two one-story buildings nestled against the high rocky bluffs along the beach of the Palos Verdes Hills. One building, a conventional cottage with a square roof, is used as the house for the Japanese and the other a long shack for use in the Abalone fishery. Both these buildings command a fine view of the Pacific Ocean and near them the big black rocks, the home of the *Haliotis*, are lashed by breakers as high as the cottage roof.

The drying ground of the fishery, a yard semicircular in shape, is enclosed on the ocean side by a coarse, wire fence. Rows and rows of stakes cover this yard and on these stakes are lath-like strips of wood about 18 inches from the ground, covering the quaint little yard with ladder-like platforms from 20 to 50 feet long. Big trays from $2\frac{1}{2}$ to 3 feet wide by 5 feet long are placed on these platforms. The writer made a rough count of these trays which numbered about 150. As each tray averages one hundred shell fish some idea of the importance of the fishery may be estimated. Besides the dried fish there is quite an industry in the canned product, as has been mentioned. A gasoline launch and boats are necessary to the business.

The writer lately visited the camps, which had been reported as closed, or about to close for four or five years, because of the depletion of the fish. On account of a wind storm the launch had that day been sent to San Pedro to anchor. Only three or four Japanese remained in camp and they were grinding and cutting strips of mother-of-pearl from some green Abalones (*Haliotis fulginea Phil.*) for inlaid work. The head Japanese said the fishery would be conducted four or five days a month during the winter. When asked if he expected to carry on the fishery next summer, he said he hoped so, but seemed inclined to be non-committal.

For some years it has been apparent that prohibitive measures must be taken or California would be depleted of one of her most beautiful products. Counties had tried prohibitive measures by taxation. Monterey supervisors taxed the Japanese cannery at Carmel Bay, six miles south of Monterey, \$60 per year, making it, according to Dr. Robert E. C. Stearns, unlawful to "Fish for Abalones except in deep water, and by means of diving apparatus or other deep sea devices."* This tax or license could not be called a restrictive measure *sensu stricto*. In 1903 an amendment was in-

*The Nautilus, Vol. XIII, No. 7, page 81.

troduced and approved by the California State Legislature,** Feb. 12. This amendment was included in Section 628 relative to the protection and preservation of fish, lobster, shrimp, crab, etc. The clause as passed prohibited the collecting of "any Abalones or Abalone shells of the kind known to commerce as the black Abalone (*Haliotis Californica*) the shell of which measures less than fifteen inches around the outer edge of the shell." In 1905 this section of the Penal Code of California was further amended regarding this mollusk, the size of the black Abalone being amended to read twelve inches around the outer edge of the shell, instead of fifteen. Section 628, reads as follows:

"PROTECTION AND PRESERVATION OF FISH; CLOSE SEASON, LOBSTER OR CRAWFISH, SHRIMP, STURGEON OR CRAB, BLACK ABALONES. PENALTY. Every person who, between the first day of April and the fifteenth day of September of each year, buys, sells, takes, catches, kills or has in his possession, any lobster or crawfish; or who at any time has in possession any lobster or crawfish of less size than nine and one-half inches in length, measured from one extremity to the other, exclusive of legs, claws or feelers; or who at any time offers for shipment, ships, or receives for shipment or transportation, from the State of California to any other place in any other state, territory, or foreign country, of any dried shrimp or shrimp shells; or who, between the first days of September and the first days of November of each year, buys, sells, takes, catches, kills, or has in his possession any crab; or who, at any time, buys, sells, offers for sale, takes, catches, kills or has in his possession any sturgeon or any female crab or any crab which shell measures less than six inches across the back, or any abalones or abalone shells of the kind known to commerce as the black abalone (*Haliotis Californica*), the shell of which shall measure less than twelve inches around the outer edge of the shell, or any other abalone shells, or abalones, the shell of which shall measure less than fifteen inches around the outer edge of the shell is guilty of a misdemeanor."‡

A writer in *The Times* says of the Japanese fishermen at White's Point they "get around this very easily by taking the meat of the baby abalones and letting the shells drop to the bottom of the sea."**‡ That Section 628 has been enforced the fines for individual cases testify; men on Anacapa Island, at Ventura and Redondo were each fined \$20.00 for the offence. Rather a big price to pay for im-

**The writer is indebted to Mr. T. W. Robinson, Librarian Los Angeles Law Library, and Mr. John C. North, office of the District Attorney of L. A. Co., for courtesies extended *in re.*

‡Misdemeanor: Minimum, one day in jail or fine of \$2.00; maximum, six months in prison or fine of \$5.00.

*‡Los Angeles Times, Oct. 7, 1906.

mature shells. Mr. H. I. Pritchard, Deputy State Fish Commissioner, to whom the writer is indebted for information relative to the enforcement of the law, says of Japanese arrested near San Clemente Island and near Santa Cruz Island: "They were all heavily fined." they used "diving suits and took 45,000 shells in 60 days."

It is to be regretted that the law makers tried to give the scientific name for the black abalone, as *Haliotis Californiensis Swainson*—which was evidently intended, there being no such a shell as "*Haliotis Californica*"—is a rare variety of the black abalone and the writer believes not reported north of the Mexican line. The name of the common black abalone found on the coast is *Haliotis Crach-erodii* Leach*.

As to the law it is very evident it has been tried and found wanting, not because it is a dead letter, but rather, because it is inadequate. As a rule an immature specimen is of little value as it is the adult that is more highly prized, but if these mollusks are destroyed as soon as old enough to propagate of what use to the state is the preservation of the young? To illustrate: Were a gardener to prohibit the removal of all young plants from his garden of annuals but at the same time permit the general destruction of all plants ready to bloom his sanity might be questioned.

If instead of allowing the fishing of mature shells every year, and, every month in the year, it limited the industry to one year in every four or five, even then, with some clause as to amount collected, there would be some restriction in the destruction of these mollusks though the law regarding the collecting of the young remained as now.

In primitive times on the California coast abalone shells not only occupied a distinguished place for ornamental uses, but the "coin of the realm" being in shell money the relationship of the *Haliotis* to other genera of shells was of the highest value.

Stephen Powers, the well known ethnologist, says of this money: "The money answering to gold is made from varieties of the ear-shell (*Haliotis*) and is called *ullo*. * * They cut these shells with flints into oblong strips from an inch to two inches in length, according to the curvature of the shell, and about as broad as long. Two holes are drilled near the narrow end of each piece, and they are thereby fastened to a string (made of the inner bark of the wild cotton or milkweed—*Asclepias*) hanging edge to edge. Ten pieces generally constitute a string, and the larger pieces rate at \$1 a piece, \$10 a string; the smaller in proportion, or less, if they are not pretty. Being susceptible of a high polish this money forms a beautiful ornament, and is worn for necklaces on gala days. But

*Abalone and the Penal Code of California; *The Nautilus*, Dec., 1906.

as money it is rather too large and cumbersome, the Indians generally seek to exchange it for the less brilliant but more useful hawok* (*Pachydesma crassatelloides*). The *ullo* may be considered rather as jewelry."**

When civilized man appeared imitation found its way into the currency of the red man and as a natural consequence the abalone money of the Indians was affected by the spurious sort and shell money fell below par as a means for barter. When these shells had lost their commercial value, yet, according to Stephen Powers, they were still valued by the old Indians. He says: "It is singular how the old Indians cling to this currency when they know it will purchase nothing from the stores; but then their wants are few and mostly supplied from the sources of nature; and, besides that, this money has a certain religious value in their minds, as being alone worthy to be offered up on the funeral pyre of departed friends or famous chiefs of their tribes."***

The tools of the aborigines, with the exception of such simple implements as the drill used for boring holes and cutting ornamental piece out of shells, were chiefly obsidian or flint knives and awls.

Some years ago the writer saw one of these drills for making wampum and marveled that so simple an implement could have done the work. Evidently dexterity in its use compensated for the lack of mechanism in the tool.

The hurry of civilization that makes time the servant of labor by the use of steam and dynamo had no place in their minds as they patiently cut and carved with drill and knife the various shapes "concentric, elliptic, lanceolate, falciform leaf-shaped" and "discoidal pieces" (1)

The aboriginal mode of cutting and polishing the *Haliothis* contrasted with the methods employed today tell the story of the evolution of physical science. To "hitch your wagon to a star" is an ideal flight, but the imagination is no less quickened when we learn that the electric current that has made possible the carborundum (2)

*Hawok or hawock. "This may be called the silver," Powers.

**Contributions to N. Amer. Ethnology, Vol. III, 1877, pp. 336-337; also quoted by Dr. Stearns in Ethno Conchology.

****Ibid.* p. 336.

(1) Ethno Conchology: A Study of Primitive Money, by Robert E. C. Stearns, U. S. Nat. Mus., 1886-87, p. 329.

(2) Carborundum is manufactured from sands, coke, sawdust and salt subjected to heat from the electric currents of Niagara Falls, N. Y. It was discovered by E. G. Acheson. See Mineral Resources U. S., 1892, p. 753-4. Also "Carborundum: Its History, Manufacture and Uses," by E. G. Acheson, Journal of Franklin Institute, Vol. 136, pp. 194, 279. Also "Carborundum At Niagara Falls," by Francis A. Fitzgerald, Journal of Franklin Institute, Vol. 143, pp. 81-96.

that polishes the abalone of the Pacific shore is furnished by Niagara Falls. This crystalline substance whose hardness is hardly less than that of the diamond is the powder that polishes to a glassy smoothness the rough outer surface of the *Haliotis*. The emery wheel could not do it for the Lapidary, but the wheel charged with carborundum is the wand. These wheels or disks, with a hole in the center, are made of layers and layers, to the number of forty, of thin, coarse muslin, around the circumference is the carborundum reduced to a coarse powder.

The rough epidermis of the *Haliotis* is first removed by using a coarse wheel charged with tripoli, then another with rouge, and later on they are ready for the glassy polish that only the carborundum can give.

While California, with its possibilities for outdoor work all the year round, makes this work of grinding and polishing of less fatality—having fresh air at command—yet even here the constant worker along this line finds human nature has limits of endurance. J. A. McIntosh, who has a little shop for three or four workers, on Main street, in Los Angeles, has been in the polishing business longer than any of his confreres—he having manufactured shell novelties since 1888.

While all parts of the abalone are utilized in ornamental work, breastpins, cuff buttons, etc., are made from the muscular impression, or muscle scar* found on the interior of the shell. This muscular impression, noted for its iridescence, becomes more beautiful after the animal has matured—in a young shell—especially of the black abalone, the impression is hardly recognizable or much less brilliant. From the muscle scar of an adult black abalone (*Haliotis cracherodii Leach*), stick pins are made that imitate cacholong, a variety of opal, commonly known as pearl opal.**

The peculiar shape of the *Haliotis* rendered it at once a handy utensil or dish for the Indians, the only drawback being the little round holes under the columella, and these they closed with asphaltum. Today campers utilize the shell in many ways even as the aborigines may have done. Commerce recognizes their possibilities as useful objects, soap trays, pin trays, etc., prepared for the trade find their way into curio stores, thence to seaside and mountain cottages, or, as curios for the tourists.

The Indians made their fish hooks from the thick part of *Haliotis*.*** George Frederick Kunz describes the process: "Pearly shells

*These muscle scars are the point of connection between the animal and the shell—the most beautiful play of colors is found in these impressions, which sometimes assume grotesque shapes in their iridescent outline.

**This name is also given to the abalone imitation.

***Rept. U. S. Geographical Surveys: Archaeology by Frederick W. Putnam, Vol. VII, p. 223, 1879.

are cut into rude disks of about two inches in diameter; these are then perforated and the perforations gradually enlarged until the disk is reduced to a flattish oval ring; this ring is then cut through on one side, and worked into the shape of the letter C, and the completed hook is soon attained."‡

Spoons,*‡ knives and forks, etc., made from abalones are familiar objects in commerce, as well as articles decorated with inlaid work. George Frederick Kunz, in his work on Pearls and Pearl Shells, describes a piano once exhibited in New York having an entire keyboard of mother-of-pearl, the flats and sharps of green abalone contrasting with the keys of white pearl.

He says of the preparation of the abalone for inlaid work that at Nagasaki the polishing of the shell is not scientifically conducted; the slow process of a fine-grained sandstone being their mode of polishing. But if science facilitates the work of polishing in the United States, the Japanese are far in the front rank in their exquisite laquer work with "beautiful butterflies in abalone on gold laquer,"* hawthorn and other floral devices in transparent laquer.

But the abalone industry, as an art, is only in its infancy on our shores.

Commercially pearls from *Haliotis* do not rank with those of the pearl oyster (*Malea grina margaritifera*), from the Orient, nor the pearl oyster (*Avicula*), from the Gulf of California, but these irregular pearls, commercially known as pearl baroques of abalones, have a commercial value, that in a few years has doubled the price quoted to amateur collectors who would add a few to their collection; the finest ones having a value that belong to each individual pearl.

The Indians are said to have formed artificial pearls, according to Yates,** when their *Haliotis* shells did not furnish enough natural ones.

If electric science could manufacture a mineral from sand, coke and salt, that at first deceived the elect she may evolve a jewel from the mother-of-pearl of the abalone and some other substance which we will designate as X, that will rival in beauty the now popular black pearl of the Gulf.

December, 1906.

*Pearl and Pearl Shells, p. 445, Bul. U. S. Fish Commission for 1893.

‡Spoons were also made by aborigines.

*Kunz.

**Prehistoric California, by Dr. Lorenzo Gorden Yates, Bull. S. Cal., etc., S. Cal. Acad. Sci., Vol. IV, 1905, p. 26.